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POISON SUMAC.

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Rhus vernix Linné (*Rhus venenàta* De Candolle) (Fam. *Anacardiaceæ*), known by various names, such as Poison sumac,[1] Poison dogwood,[1] Poison elder,[1] Poison-tree,[1] Poison wood,[2] Poison ash,[3] Swamp sumac[3] or Swamp dogwood,[3] is a small shrub or tree, six to eighteen or occasionally twenty-five[4] feet in height, which attains a diameter of from three to six or even ten[5] inches. It is found in swamps widely scattered over the eastern portions of North America, from Canada to Florida, and west to Minnesota and Louisiana.[6]

The bark is mottled-gray or brownish-gray, smooth on the branches and young shoots, but somewhat roughened on the trunks of the older trees. The leaves are compound, each leaf stalk bearing five to thirteen nearly sessile, ovate, obovate, or oval, beautiful green leaflets, each of which is acute at the apex and smooth at the edges. In autumn the colors of the foliage become extremely brilliant, scarlets, oranges and yellows predominating. In consequence of its attractive appearance at this season many collectors, ignorant of its venomous properties, are poisoned by it each year.[7] The small,

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[1] "Silva of N. Am." C. S. Sargent, III, 23–24.

[2] "Trees and Shrubs of Mass." G. B. Emerson, II, 575.

[3] "Plant Names, Scientific and Popular." A. B. Lyons, 321.

[4] "Silva of N. Am." C. S. Sargent, III, 23.

[5] "Trees of New Eng." Dame and Brooks, 136.

[6] "Silva of N. Am." C. S. Sargent, III, 23.

[7] "Trees of New Eng." Dame and Brooks, 187; also "Silva of N. Am." C. S. Sargent, III, 24.

greenish-yellow flowers, which appear late in June or early July, are borne on long, loose panicles from the axils of the leaves. The sterile and the fertile flowers are borne on separate plants. The fruit is a drupe, 4 to 6 mm. in diameter, unequal sided and somewhat flattened. At maturity in September the outer coat is thin, more or less striated, grayish-white and lustrous; the stone is pale yellow in color and noticeably grooved.

The fruit remains on the tree until spring. On wounding the trees, a pale cream-colored, thick, poisonous juice exudes in abundance. This begins to darken at once and finally becomes black.

Very little work has been done upon the chemistry of the poison of *Rhus vernix.* A number of chemists, however, have worked upon the poisonous constituents of Japanese lac (*Rhus vernicifera*) and of poison ivy (*Rhus radicans*), and, as clinical observation has established that the dermatitis caused by any one of the venomous species of Rhus is similar in appearance to that from the others, it is now generally believed that the poisons from all these plants are identical. We give below a brief digest of the results that have been obtained by previous investigations of the constituents of these plants.

In 1815 Dr. Bigelow[8] experimented upon the juice of *Rhus vernix,* and showed that it possessed varnish-forming properties similar to the juice from Japanese sumac. He says:

"A quantity of the juice was boiled alone, until nearly all the volatile oil had escaped, and the remainder was reduced almost to the state of a resin. In this state it was applied while warm to several substances, which, after cooling, exhibited the most brilliant, glossy, jet black surfaces. The coating appeared very durable and firm, and was not affected by moisture. It was elastic and perfectly opaque, and seemed calculated to answer the purposes of both paint and varnish." Dr. Bigelow seems to have done no further work upon the chemistry of the juice.

In 1859 J. Khittel[9] worked upon poison ivy. He attributed the poisonous properties of this plant to a volatile alkaloid. He did not succeed in isolating any alkaloids, however, so that his results were of but little value.

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[8] "Medical Botany," J. Bigelow, I, 101–102.

[9] Wittstein's Vierteljahresschrift für praktische Pharmacie, 7, 348–59; abstract Am. J. Pharm., 1858, 542–4.

In 1865 J. M. Maisch[10] denied the presence of a volatile alkaloid in poison ivy, but announced the discovery of a new volatile acid to which he ascribed the poisonous properties of that plant, and to which he gave the name "*toxicodendric acid.*" He prepared salts of this acid, and stated that its properties were somewhat similar to those of formic acid and acetic acid, but more nearly like the latter The conclusions of Professor Maisch remained unverified for thirty years, and standard works on pharmacology quoted them without question until Dr. Pfaff investigated the subject in 1894–96.

Dr. Pfaff[11] proved that the "toxicodendric acid" of Maisch was *acetic acid*, and that the real poison of ivy (and sumac) existed in an oily substance which he named "toxicodendrol," and which was completely *non-volatile*.

He states that he prepared this oil[12] by repeated fractional precipitations of its lead salt from alcoholic solution by means of alcoholic solution of lead acetate. The free oil was obtained from its lead compound by decomposing the latter with ammonium sulphide. He found the poisonous oil in all parts of the plant—stems, branches, roots, leaves and fruit. It was present in both ivy and sumac, but more abundant in the latter. Dr. Pfaff does not state whether the "toxicodendrol" was obtained from the green or the ripened fruit, an omission to which we will again refer. According to this author, "toxicodendrol" is soluble in ether, alcohol, chloroform and similar solvents, but is insoluble in water.

It is easily decomposed by heat and is partially converted into resin on long standing. None of its other physical or chemical properties or constants were determined. The fruit of *Rhus toxicodendron* contained 3·6 per cent. of crude oil (*i. e.*, active oil contaminated with resinous matter and with oil not precipitated by lead acetate), the leaves 3·3 per cent. and the stems and branches 1·6 per cent.

Rhus vernicifera, the Japanese varnish tree, exhibits poisonous properties similar to the American sumac. The milk juice, which exudes when the plant is wounded, forms the Japanese lac of Oriental commerce. Several chemists have investigated the prop-

[10] Proc. Am. Pharm. Assoc., 1865, 166.
[11] J. Exp. Med., Vol. II, No. 2, 1897.
[12] J. Exp. Med., Vol. II, No. 2 (1897), 187.

erties of this juice. The earliest was Ishimatsu, who reported[13] that the lac had a sweetish odor, an irritating taste, that it burned with a luminous flame, which emits dense black smoke, and that it mixes with fixed oils in all proportions. He found that the lac consisted of a substance soluble in alcohol, a gum soluble in water, a residue insoluble in alcohol or water, and small quantities of water and "volatile poison."

His method of separation was to extract the milk-juice with absolute alcohol, evaporate the solvent and dry the dissolved portion at 100° to constant weight. The portion insoluble in alcohol was extracted with hot water, filtered, the filtrate evaporated and the residue dried at 100° and weighed as gum. The residue insoluble in water was dried at 100° and weighed. Water and volatile matter were determined by difference.

He found that the fresh lac yielded 58·24 per cent. of substance soluble in alcohol. This alcohol-soluble substance was brownish-black in color and had the same odor as the original; however, it never dries to a varnish as that does. Lead salts of this compound were prepared and analyzed, from which the formula $C_{20}H_{30}O_2$ was calculated. No experimental proof that the poisonous constituent was volatile was offered.

In 1883 H. Yoshida,[14] employing Ishimatsu's method of separation, found 85·15 per cent. of alcohol-soluble substance in fresh lac of known purity. He called this soluble substance *urushic acid* (from Ki-urushi, Japanese lac). He states that the gum is identical with gum acacia, and reports the portion insoluble in alcohol or water as diastatic matter. He proved that the hardening of the lac was due to an oxidizing enzyme acting in the presence of moisture. Like the previous investigator, Yoshida believed that the poisonous constituent of the lac was volatile, but offered no experimental proofs for this supposition. Yoshida found that urushic acid was soluble in benzin, ether and carbon disulphide; less easily soluble in amyl alcohol and petroleum of high boiling point; insoluble in water; sp. gr. 0·9851 at 23°. It remains unchanged at 160°, but slowly decomposes with carbonization at 200°. From the alcoholic solution of urushic acid many salts were prepared, most of which were slightly soluble in alcohol, but insoluble in water. From the analy-

[13] Manchester Lit. and Philos. Soc. [3] 1882, 249.
[14] J. Chem. Soc., 1883, 472.

sis of its lead salt Yoshida calculates the formula $C_{14}H_{18}O_2$ for urushic acid. By oxidizing urushic acid with chromic acid and analyzing the product obtained, he concluded that this acid takes up one atom of oxygen to form *oxyurushic acid*, $C_{14}H_{18}O_3$. He prepared and analyzed a bromine derivative of urushic acid, to which he ascribed the formula $C_{14}H_{12}Br_6O_2$.

In 1905 Tschirch and Stevens[15] showed that the *volatile* principle of Japanese lac was *acetic acid* and that the *poisonous constituent* was a resinous substance which was *non-volatile.* This resinous substance was obtained by extracting the lac with alcohol and evaporating the filtrate (as Ishimatsu and Yoshida had done), taking up the residue with petroleum-benzin (b. p. below 65°) and pouring the solution into a large excess of fresh petroleum-benzin. A non-poisonous, semi-fluid resin was precipitated, while the poisonous substance remained in solution and was obtained as a dark, brownish-red oil on decanting and evaporating the solvent. By agitating the benzin-soluble portion with ethyl alcohol and petroleum-benzin in immiscible proportions, the poisonous principle remained in the alcoholic layer on separation. An oily, non-poisonous, brownish-red residue was left on evaporating the benzin layer, while the alcoholic layer gave a poisonous resin of similar appearance. Three fractions were thus obtained, but one of which was poisonous. Analyses of these will be referred to later. All were soluble in alcohol and all gave black precipitates with alcohol-soluble salts of mercury, iron, copper and silver. Lead acetate gave a gray precipitate, which became darker on standing. By oxidation all of the resinous substances gave a brown insoluble substance which the authors called *oxyurushin*,[16] and to which they gave the formula $C_{102}H_{138}N_2O_{19}$.

Gum and diastatic matter were also obtained from the lac, but the authors were unable to separate them. By using Ishimatsu's method of separation Tschirch and Stevens found the following results for Japanese lac :[17]

	Per Cent.
Soluble in alcohol	72.40
Soluble in water	4.05
Insoluble residue	2.35
Water and volatile matter	21.20

[15] Arch. Pharm., 243, 516.
[16] Arch. Pharm., 243, 524.
[17] Arch. Pharm., 243, 515.

The alcohol-soluble portion was further separated into two portions by petroleum-benzin, as noted above, with the following results:

	Per Cent.
Benzin-soluble	78
Benzin-insoluble	22

By means of methyl alcohol and ether the benzin-insoluble portion could be further separated into three fractions.

The gum enzyme contained nitrogen, yielded mucic, oxalic and tartaric acids on oxidation with nitric acid, and produced a non-crystallizable, non-fermentable, dextro-rotatory, reducing sugar on hydrolysis with dilute sulphuric acid. The phenylhydrazine[18] derivative of this sugar melted at 162°–164°, corresponding to phenylsorbinosazone.

The gum-enzyme was very active, its aqueous solution rapidly changing freshly prepared tincture of guaiac to a deep blue color. This action was far stronger and more rapid with lac gum than with any other of the eleven gums tried. Tacamahaca, asafœtida and acacia approached lac gum most nearly in this respect.

Recently Acree and Syme[19] have worked upon poison ivy. They found gallic acid, fisetin, rhamnose and a "*poisonous tar, gum or wax*" in the extract prepared by maceration of the leaves and flowers of poison ivy with ether, and subsequent distillation of the solvent. The lead compound of this poisonous substance was found to be soluble in ether. The authors utilized this property to free the poisonous material from admixed non-poisonous substances. Lead compounds were first prepared by precipitating an alcoholic solution (of the ether extract of the drug) with lead acetate. The precipitate was washed with water, partially dried over sulphuric acid, placed in a Soxhlet apparatus and extracted with ether until the solvent came over colorless. A green solution was obtained, which was washed with water and decomposed with hydrogen sulphide. On evaporating the solvent, a black, poisonous "tar or gum" remained. Upon hydrolysis[20] with 2 per cent. sulphuric acid, this poisonous substance gave fisetin, rhamnose and gallic acid. The residue in the thimble was decomposed by hydrogen sulphide,

[18] "Japanese Lac." Dissertation. A. B. Stevens, 17, 1905.
[19] Am. Chem. J., 36, 301–321. 1906.
[20] Acree and Syme: Am. Chem. J., 36, 316.

shaken with ether and evaporated. A hard, brittle, yellow, non-poisonous resin was given. The authors believe that the poisonous principle of poison ivy is a complex substance of glucosidal nature.

In our investigations we have used the juice from *Rhus vernix*, which was collected for the most part in October.

METHOD OF GATHERING THE JUICE.

With a knife having a V-shaped blade incisions 5 to 10 centimeters apart and about 5 mm. in depth were made around the trunk and larger branches, perpendicular to the axis of the stem. The juice, which oozes out abundantly, was collected by scraping out the grooves with a sharpened stick and discharging the adhering lac into a wide-mouthed bottle. By drawing the stick across a string stretched across the mouth of the bottle, the process is greatly facilitated. The juice fills the grooves in from 5 to 20 minutes after the incisions are made, and, unless gathered at once, is prone to overflow. The juice occurs as a thick, yellowish-white, sticky emulsion, which on exposure begins at once to change to brown and finally becomes black. If exposed to the air in an open container a black skin of oxidized substance forms over the surface, which protects the portions below from change. The juice has a peculiar odor, which seems to be characteristic of the sumac plant. By the above method of collection four trees of average size yielded a mean of 8.09 grammes of juice.

VARNISH PROPERTIES OF THE LAC.

We have made several experiments to ascertain whether this juice could be employed as a varnish like the Japanese lac. In 1815 Dr. Bigelow[21] had concluded that the juice of the American poison sumac might be used as a varnish. His method of application, however,* was not like that employed by the modern Japanese for their lacquered wares. We have employed a method somewhat similar to that of the Japanese as reported by Rein.[22]

Three smooth pine sticks were treated as follows: No. 1 was treated with a thin coat of lac, No. 2 with a thick coat of the same, while No. 3 received a coating of a mixture consisting of raw

[21] "Med. Botany," J. Bigelow, I, 101–102.

* See p. 4.

[22] "The Industries of Japan," J. J. Rein, 339–77.

lac 70 and water 30. The sticks were permitted to remain at ordinary temperature in a closed vessel saturated with aqueous vapor (Scheibler desiccator charged with water) for twenty-four hours, then removed from the moist atmosphere and dried in an air bath at 50°. Three successive coats were applied at intervals of forty-eight hours, care being taken to maintain the order and treatment as given above. All three sticks became covered with a glossy, black varnish which could be readily polished. At the close of the experiments no appreciable difference was noted between No. 1 and

Method of collecting the Lac from the American poison Sumac, near Ann Arbor, Mich.

No. 2. No. 3 dried more rapidly than the other two, but was otherwise similar. From these experiments and from other observations on the behavior of the lac (made while carrying out other experiments) we are led to concur with Dr. Bigelow in the belief that this juice could be employed as a varnish as a substitute for the Japanese article.

CHEMICAL INVESTIGATION OF THE JUICE.

The juice was first strained through two thicknesses of dry cheese cloth to remove bark and other foreign matter. It was then stirred to insure a uniform composition. Its reaction was faintly acid to litmus paper; sp. gr. 0·99762 at 20° C./20° C.

Fifty grammes of the juice were placed in a steam distillation apparatus and distilled for five hours. The distillate was neutral to litmus. The emulsion in the distilling flask was scarcely changed in appearance. Twenty cubic centimeters of 10 per cent. H_2SO_4 were then added to the contents of the flask and the distillation continued for five hours more. The emulsion was broken up by this treatment, so that the mixture separated into two layers on standing and cooling. This distillate was very slightly acid to litmus. A trace of alkali was added to each of the distillates, after which they were evaporated separately to a small bulk. No acetic acid could be detected in either by tests with ferric chloride, sulphuric acid and ethyl alcohol, or arsenous acid and alkali. The distillates and the residue in the distilling flask were each separately shaken out with ether and the ethereal layers evaporated. Only mere traces of a pale yellow, oily residue remained from the distillates, while the contents of the distilling flask yielded about 45 grammes of a dark red, oily substance. None of these oily residues were poisonous. As the original material was highly poisonous, it is evident that the poisonous properties of the lac are destroyed by long-continued heating.

In our investigations we have employed two methods of testing for poisonous properties. The first was one used by Stevens[23] in his work on Japanese lac. A hole about 6 mm. in diameter was cut with a cork borer through a piece of gummed paper, the paper pasted on the arm and the suspected substance applied to the opening by means of a glass rod. In thirty minutes the paper was removed and the arm thoroughly washed with ether. If the substance were poisonous the spot became red and began to itch in twenty to thirty hours. The second method was one used by Dr. Jadassohn,[24] of the University of Bern, and reported by Tschirch and Stevens. It consisted in rubbing a drop of the suspected substance by means of a glass rod upon the inner surface of the ear of a rabbit. If poisonous, redness and swelling would appear in two to five or six days, followed by watery blisters and even by necrosis of the superficial layers of the skin. This condition would gradually disappear after about two weeks. In the case of the rabbit we

[23] Am. J. Pharm., 78, 63.
[24] Arch. Pharm., 243, 528.

have found the symptoms of poisoning by *Rhus vernix* similar in all respects to those caused by *Rhus vernicifera.*

SEPARATION OF THE RESINS FROM THE LAC.

A large sample of the strained lac was agitated with three volumes of 95 per cent. alcohol and poured on a filter. A brownish residue remained undissolved, which became darker on further exposure to the air. This residue was again shaken with alcohol and the process repeated until the filtrate became colorless. The insoluble portion was then washed with ether and dried in the air. It was a reddish-brown powder, only partially soluble in water. The alcoholic filtrate was evaporated under reduced pressure. It gave a dark, amber-red, oily liquid. These residues were reserved for further study.

To determine the composition of the lac by solubility, we employed a modification of the method used by Ishimatsu for Japanese lac. The method used is as follows: Five grammes of the strained lac were transferred from a weighing bottle to a mortar, triturated with 95 per cent. alcohol, allowed to settle five minutes, and the supernatant solution decanted through a tared Gooch crucible containing a mat of asbestos at least 1·5 centimeter in thickness. More alcohol was then added to the residue in the mortar and the trituration and decantation repeated. The insoluble residue was then transferred to the Gooch, washed twice with strong alcohol, once with ether, dried at 100° C. and weighed. The percentage insoluble in alcohol was calculated from this. To determine the portion insoluble in water the dried residue in the Gooch crucibles, together with the upper layers of asbestos, was transferred to a mortar and repeatedly triturated with hot water. The mixture was passed through the Gooch in which the alcoholic-insoluble residue was first weighed, the residue washed with hot water, dried at 100° and weighed. The residual weight represents the portion insoluble in water (or alcohol) and the loss in weight the portion soluble in water. The determinations were made in duplicate and in triplicate, the results usually being very concordant. From the tabulated results given below it will be seen that the composition seems to vary somewhat in different months and also from different parts of the tree, though the number of determinations made was insufficient to establish the

extent of such variations. The specific gravity would probably vary also, but no experiments were made to verify this supposition.

Date of Collection.	Soluble in Alcohol. "Crude Resin."	Insoluble in Alcohol.	Insoluble in Alcohol.		Water (by difference).
			Soluble in Water.	Insoluble in Water.	
October 20, 1905 . . .	80.458	6.134	4.393	1.741	13.408
June 1, 1906	79.608	5.316	3.371	1.945	15.076
August 29, 1906	75.892	5.175	3.476	1.699	18.933
October 20, 1906 . . .	84.330	5.699	3.994	1.705	9.971
From near foot of trees, Nov. 3, 1906	80.223	8.018	5.393	2.625	11.759

For comparison we append a tabular statement of the composition of Japanese lac compiled from the reports of various workers.

Observer.	Soluble in Alcohol. "Urushic Acid."	Insoluble in Alcohol. Calculated by Stevens and Warren.	Gum.	Nitrogenous Residue.	Water and Volatile Matter (by difference).
Ishimatsu	58.24	8.59	6.32	2.27	33.17
Yoshida	85.15	5.43	3.15	2.28	9.42
Korshelt and Yoshida	80.00	8.00	4.69	3.31	12.00
			Insoluble in Alcohol.		
			Soluble in Water.	Insoluble in Water.	
Tschirch and Stevens	72.40	6.40	4.05	2.35	21.20

RESIDUE INSOLUBLE IN ALCOHOL.

The alcoholic-insoluble residue was dissolved in cold water as completely as possible (by trituration in a mortar with a small quantity of water) and filtered into a small quantity of alcohol. The resulting mixture was then poured into a large volume of alcohol. A white precipitate was produced which, after purification by repeating the above process several times, was found to have the properties of the gum obtained by Ishimatsu,[25] Stevens[26] and others from Japanese lac. In most respects it was similar to gum acacia under the same conditions. When prepared as described above, after filtering and drying, this gum possesses a powerful enzymatic action

[25] Manchester Lit. and Philos. Soc. [3], 249. 1882.

[26] "Japanese Lac." Dissertation. A. B. Stevens, 43. 1906.

far exceeding that of acacia. Its aqueous solution rapidly changes freshly prepared tincture of guaiac to a deep blue color; with naphthol it produces a purplish-blue color, and with guaiacol a red color in 30 minutes; no effect was produced with vanillin and hydrochloric acid. An aqueous solution of the gum-enzyme does not convert starch paste into reducing sugars even by standing at 40° for 96 hours. An emulsion prepared from the gum-enzyme, water and the separated resins, blackens on standing like the fresh lac. An aqueous solution of the gum-enzyme is rendered inactive by boiling, though the fresh lac may be boiled in 95 per cent. alcohol for twenty minutes without becoming completely inactive. By boiling for eight hours with 2 per cent. sulphuric acid the purified gum yields a non-crystallizable, non-fermentable, dextro-rotatory sugar, which reduces Fehling's solution, but has no effect on Barfold's solution of cupric acetate. The purified gum contained appreciable quantities of nitrogen, which could not be removed by repeated precipitations with alcohol.

It was found that the portion insoluble in water could not be completely freed from gumming or mucilaginous matters even by repeatedly triturating with cold water or by long-continued boiling with the same solvent. After the most thorough washing with water the insoluble residue (if unboiled) still produced a blue color when kept for several hours in contact with water to which a few drops of tincture of guaiac have been added. It was of a rich, chocolate-brown color, odorless and tasteless. When boiled for five hours with 2 per cent. sulphuric acid it yielded only the merest traces of reducing sugars without appreciable change in bulk. Probably these traces of sugar were derived from minute quantities of gummy matters remaining in the sample, which had failed to be removed by previous boiling and washing with water. When examined by the Lassaigne test and by the Kjeldahl quantitative method the substance was found to be rich in nitrogen. When boiled with dilute potassium hydroxide it darkened, forming a hard, brown-black substance which could not be powdered readily. Neither the gum nor the portion insoluble in water was poisonous.

CRUDE RESINS.

On evaporation the alcoholic filtrate from the lac gave a dark, amber-red, oily, non-volatile liquid, having a peculiar, not unpleasant

odor, suggestive of the original juice. Evidently the odor of the plant is due to this oily substance. A drop of it, when allowed to sink into paper, produces a "grease-spot" like a true fat or oil. It is not a fat, however, as it produces no glycerol when saponified. It has a faintly acid reaction, a specific gravity of 0·9888 at 25° C./25° C., and is soluble in the usual solvents for resins and oils. When tested on the ear of a rabbit it was found to be very poisonous. It does not possess the properties of a glucoside or of an alkaloid. When dissolved in chloroform it unites with bromine and with iodine with great violence, with copious evolution of hydrobromic or hydriodic acids. On evaporating the solvent, a hard, black varnish remains, which is very lustrous and apparently durable.

Following the nomenclature adopted by Tschirch and Stevens in their work on Japanese lac, we have designated the alcoholic-soluble portions of the latter from *Rhus vernix* as *resins*, though they do not possess all the properties generally attributed to these bodies. In general, however, their properties were found to conform more nearly to the resins than to any other class of organic products.

SEPARATION OF THE LAC-RESINS.

In all proportions the crude resin was found not to be completely soluble in methyl alcohol, oil of turpentine, and petroleum benzin. With slight deviations, the method devised by Tschirch and Stevens[27] for the separation of the lac-resins of Japanese lac was used in our work. As finally adopted the method was as follows: 100 c.c. of the crude resins were dissolved in 900 c.c. of petroleum benzin (b. p., below 50°), forming a clear, dark amber-red solution. This was then slowly poured with stirring into 9,000 c.c. of cold benzin; a dense, brownish-gray cloud was immediately formed, which slowly subsided. At the end of twenty-four hours the supernatant liquid was clear and could be decanted with ease. A red-brown, semi-fluid mass remained, which was insoluble in fresh benzin.

BENZIN-INSOLUBLE RESIN.

The benzin-insoluble resin was washed repeatedly by covering it with benzin in a shallow dish and stirring with a glass rod until the washings became colorless. On drying the residue over H_2SO_4 under reduced pressure, a very viscous, red-brown, resinous, sticky

[27] Arch. Pharm., 243, 518.

mass, having the odor of the crude resin, was obtained. This substance, which amounted to 15·5 per cent. of the original, had a sp. gr. of 1·05167 at 25° C./25° C. It slowly hardened at ordinary temperature and was not poisonous. By heating for several hours at 110° C. it yielded a solid, dark-brown mass, which was insoluble in all ordinary solvents and was exceedingly difficult to pulverize. Analysis of the dried product gave the following results:

I.

0·3165 gramme gave 0·2121 gramme H_2O and 0·8683 gramme CO_2.

II.

0·3382 gramme gave 0·2326 gramme H_2O and 0·9295 gramme CO_2.

I.

0·5026 gramme gave 9·6 c.c. N at 23° C. and 739 mm.

II.

0·5014 gramme gave 9·5 c.c. N at 23° C. and 736 mm.

	I. Per Cent.	II. Per Cent.	Mean. Per Cent.
Hydrogen	7·527	7·693	7·610
Carbon	75·129	74·955	75·042
Nitrogen	2·092	2·067	2·079

The undried resin was soluble in alcohol, chloroform, glacial acetic acid and partially soluble in ether and methyl alcohol; it was insoluble in glycerol, water or petroleum benzin. When boiled with alcoholic KOH, the undried resin yielded a brown-black soap, soluble in water, and a brownish-black insoluble substance, but no glycerol. Aqueous solutions of this soap lather considerably when shaken, but have no detergent properties. The properties of the insoluble substance are similar to those of "oxyurushin" obtained by Tschirch and Stevens[28] from Japanese lac. Many attempts were made to determine its saponification number, but, owing to the great difficulty of determining the end reaction with indicators in the opaque, red-brown, soap solution, no satisfactory results were obtained. Numbers were found varying from 286·7 to 344·2 mg. of KOH. Litmus, phenolphthalein, methyl orange and alkali blue were all tried, both as external and internal indicators, but the exact point of neutrality could not be determined. The indirect method of McIllhiney[29] was also tried but without success, as the resin soap is not completely soluble in alcohol. This benzin-insoluble resin could

[28] Arch. Pharm., 243, 523.

[29] Jour. Amer. Chem. Soc., 16, 408.

not be acetylized by treatment with sodium acetate and acetic anhydride. It reacts with bromine, producing a black compound similar in appearance to that from bromine and the crude resin. It did not respond to the Lieberman-Storch[30] reaction for resins.

BENZIN-SOLUBLE RESIN.

On evaporation the solution in benzin gave a beautiful, clear, amber-red, oily, non-volatile liquid, amounting to 79·5 per cent. of the original resin. In color and odor it resembles the original resin, but its fluidity is greater and specific gravity less. Sp. gr. at 25° C./25° C. — 0·9693.

Its color is much lighter and its fluidity considerably greater than its companion resin, the benzin-insoluble portion. Its specific gravity is also considerably less. It was found to be soluble in aniline, amyl alcohol, acetone, acetic ether, benzol, petroleum benzin (b. p. below 50°), chloroform, carbon disulphide, carbon tetrachloride, ethyl alcohol, methyl alcohol, ether and toluol. Its alcoholic solution is optically inactive. It is very poisonous. It blackens with alkalies, like its companion resin, and yields a brown-black, soluble soap on saponification, without the liberation of glycerol. Its saponification number could not be obtained with exactness, as the same difficulties were encountered in determining the end reaction with indicators as was the case with the benzin-insoluble portion. Unlike the latter, however, it does not dry up appreciably on long standing or moderate heating. It unites with bromine and iodine, forming black, insoluble compounds with evolution of heat and liberation of the corresponding halogen acids. By subjecting the resin to the Grignard reaction,[31] using magnesium methyl iodide, it yields an abundance of methane, thus indicating[32] the presence of hydroxyl groups. The resultant magnesium organic halide blackens on exposure to air and is not poisonous. The resin contains no methoxyl or ethoxyl groups, as shown by negative results when tested by Zeisel's method.[33] It contains neither sulphur nor halogens. All attempts to crystallize it or to obtain a crystalline derivative were unsuccessful. By heating with acetic

[30] J. S. C. I., 1888, 136.
[31] Grignard: Ann. Chim. Phys. [7], 24, 433.
[32] Tschugarff: Ber. d. chem. Ges., 35, 3912.
[33] Zeisel: Monats. f. Chem., 6, 989.

anhydride and dry sodium acetate, an acetyl derivative was obtained which was not at all similar to the parent substance. The new compound was a pale yellow, viscous, sticky liquid, amounting to 122·9 per cent. of the resin from which it was derived, and resembling honey in odor and appearance. Like its parent resin, it was darkened by alkalies and attacked by bromine. It was neither crystalline, volatile nor poisonous.

An attempt was made to separate the benzin-soluble resin into two or more constituents by shaking with alcohol and petroleum benzin in immiscible proportions as follows:—25 c.c. of the resinous substance were dissolved in 300 c.c. of benzin (b. p. below 50° C.), and shaken out first with 66 per cent. alcohol in four portions 100 c.c., 25 c.c., 25 c.c., and 25 c.c. each; then with 85 per cent. alcohol in the same quantities and in the same order as above. On evaporation all three solvents yielded dark, amber-red fluid resins which resembled the parent substance in properties and appearance. The 66 per cent. alcoholic fraction amounted to but 15 c.c. from a 400 c.c. sample (3·75 per cent.), so that but few experiments were made with it. The other two fractions were each poisonous. The one soluble in 85 per cent. alcohol had a specific gravity of 0·9856 at 25° C./25° C.; the other a specific gravity of 0·9703 at 25° C./25° C. We are inclined to believe that no actual separation was made by this method, as each fraction yielded a black insoluble soap, together with some insoluble matter on saponification, and each gave a non-poisonous, non-volatile, acetyl derivative of similar properties. Many attempts were made to determine the saponification numbers of these products; but, as was the case with the benzin-insoluble resin, the soap solutions were too dark to determine the point of neutrality with exactness. By employing alcoholic KOH, numbers were obtained ranging from 238·7 to 321·4 for the resins, and from 459·9 to 510·0 for their acetyl derivatives. Barium hydroxide in hydro-alcoholic solution was also tried, but the results were no more satisfactory than with KOH. In this case the excess of barium hydroxide was determined gravimetrically after precipitating and filtering out the insoluble barium compound. The barium compound was bluish-gray in color and non-poisonous.

TREATMENT WITH LEAD ACETATE.

With an alcoholic solution of lead acetate the 85 per cent. alcoholic fraction and the benzin-soluble fraction, obtained as above, each gave a flocculent light-gray precipitate, which darkened considerably on standing. By slightly modifying the method of fractional precipitation used[34] on the resins of Japanese lac, we have obtained several fractions from the benzin-soluble portion of the resin. All these fractions were dark, brown-red, poisonous liquids, similar in appearance to the original resin.

The method as finally adopted was as follows:

The resin was dissolved in 95 per cent. alcohol, and an alcoholic solution of lead acetate added as long as a precipitate was formed. The precipitate was filtered out, washed with alcohol, suspended in fresh alcohol and decomposed by H_2SO_4. The excess of acid was removed by lead carbonate and the filtrate evaporated. The alcoholic filtrate from the first precipitate was treated with sulphuric acid, then with lead carbonate, filtered, evaporated to remove alcohol and shaken out with ether. Upon evaporating the ether, a dark red-brown residue was obtained, which, when dissolved, in alcohol, was readily precipitated by alcoholic lead acetate solution. This precipitate was treated like the first, and this process was repeated until no appreciable precipitate could be obtained with lead acetate solution. As these fractions were all so similar in appearance and properties, we believe that no actual separation was accomplished.

Syme and Acree[35] state that they separated the poison of poison ivy from impurities by extracting its impure lead compounds with ether in a Soxhlet apparatus and decomposing the resultant soluble extract with hydrogen sulphide. We have attempted to separate the resins of poison sumac by this method. Lead compounds were first prepared by precipitating an alcoholic solution of the benzin-soluble, poisonous resin with a hydro-alcoholic solution of lead acetate. The lead precipitate was washed with diluted alcohol by decantation, thrown on a filter, further washed with diluted alcohol and finally with hot water. It was then placed in a desiccator over sulphuric acid until partially dried (twenty-four hours), and extracted with ether in a Soxhlet apparatus until the solvent came over color-

[34] "Japanese Lac." Dissertation. A. B. Stevens, p. 20, 1906.

[35] Am. Chem. J., 36, 313–5.

less. This required about ten hours. The insoluble residue in the thimble was removed, dried in the air and again extracted with ether. Only a trace of colored substance was removed. The insoluble substance in the thimble was then decomposed by H_2SO_4 in alcoholic suspension. A non-poisonous oil was given on evaporation of the solvent. The ether extract, which was of a deep green color in ethereal solution, was filtered and dried by immersing sticks of fused calcium chloride in its ethereal solution for twenty-four hours. On evaporation of the solvent it yielded a dark-brown, oily residue, which was poisonous and which contained 37·7 per cent. of lead. Further experiment showed that this residue was a mixture, consisting of an oily, lead-free, poisonous substance, soluble in alcohol, and a non-poisonous, true lead compound insoluble in alcohol. The lead compound (which was present in far greater proportion), when separated from its oily congener, suspended in ether, and decomposed by hydrogen sulphide, yielded a light yellow, ill-smelling oil, which was very poisonous. It is probable that this odor was due to compounds of hydrogen sulphide with ether, rather than to any characteristic of the poisonous substance, as the resin obtained by decomposing the lead compound with sulphuric acid had no such odor, but was at the same time poisonous. Three fractions were thus obtained; that from the ether-insoluble lead compound was non-poisonous, that from the ether-soluble lead compound was poisonous, and the lead-free oily, poisonous portion.

A considerable quantity of the poisonous resin was obtained by suspending the green ether-soluble lead compound in alcohol and decomposing it by sulphuric acid. Excess of acid was removed by lead carbonate, and the liquid after filtration evaporated under reduced pressure. This residue was of a dark amber-red color, had the characteristic sumac odor and was very poisonous. Its lead precipitate, prepared by the method given above, was found to be almost completely soluble in ether when extracted for a long time in a Soxhlet apparatus. This second ether extract resembled the first in physical properties, but when decomposed by sulphuric acid, and subsequent evaporation of the solvent, the resultant resin was found *not* to be poisonous. As this substance was no longer poisonous and lack of time prevented the preparation of a fresh quantity of the material, no further work was done upon the resins.

A number of combustions were made upon the products obtained,

but the results were not always concordant, although great care was used. This, together with the great variation in the saponification numbers and the variable amounts of insoluble matter produced by saponification, would indicate that the poisonous substance is a complex mixture rather than an isolated compound.

The following results were obtained by combustion:

PORTION SOLUBLE IN BENZIN WHEN SHAKEN WITH ALCOHOL.

I.

0·2574 gramme gave 0·2187 gramme H_2O and 0·7192 gramme CO_2.

II.

0·2747 gramme gave 0·2344 gramme H_2O and 0·7659 gramme CO_2.

I.

0·4716 gramme gave 5·2 c.c. N at 21° C. and 738 mm.

II.

0·4282 gramme gave 4·8 c.c. N at 20° C. and 732 mm.

	I. Per Cent.	II. Per Cent.	Mean. Per Cent.
Hydrogen	9·461	9·544	9·502
Carbon	76·203	76·040	76·122
Nitrogen	1·101	1·105	1·103

Portion dissolved by 85 per cent. alcohol when shaken with benzin.

I.

0·2833 gramme gave 0·2424 gramme H_2O and 0·8116 gramme CO_2.

II.

0·2499 gramme gave 0·2152 gramme H_2O and 0·7182 gramme CO_2.

I.

0·4645 gramme gave 5·1 c.c. N at 20·5° C. and 743 mm.

II.

0·4608 gramme gave 5·2 c.c. N at 21·5° C. and 738 mm.

	I. Per Cent.	II. Per Cent.	Mean. Per Cent.
Hydrogen	9·571	9·632	9·601
Carbon	78·131	78·380	78·255
Nitrogen	1·104	1·124	1·114

Combustion of the acetyl derivative from the portion soluble in 85 per cent. alcohol.

I.

0·2738 gramme gave 0·2043 gramme H_2O and 0·7207 gramme CO_2.

II.

0·2603 gramme gave 0·1923 gramme H_2O and 0·6819 gramme CO_2.

I.

0·5047 gramme gave 5·6 c.c. N at 26° C. and 736 mm.

II.

0·5391 gramme gave 5·9 c.c. N at 21° C. and 746 mm.

	I. Per Cent.	II. Per Cent.	Mean. Per Cent.
Hydrogen	8·342	8·249	8·296
Carbon	71·787	71·363	71·575
Nitrogen	1·084	1·119	1·101

The fact that all of the portions of resin obtained by fractional precipitation with lead acetate were poisonous, and that repeated precipitation and separation destroyed the poisonous properties, indicates that the benzin-soluble substance is not a compound, but that the apparently different substances obtained are the result of oxidation. This is supported by the fact that the final lead compound, like the ether-insoluble substance, is not poisonous. The small portion of lead-free oily substance indicates that a portion of the resin was occluded by the lead precipitate, thus preventing it from coming in contact with sufficient lead acetate to precipitate it. This is supported by the fact that after separation it is easily precipitated by the lead acetate.

Several experiments were made in order to compare the latex of poison ivy with that from poison sumac. The juice was collected from the ivy stems by a method analagous to that used for sumac. It occurs in ivy far less abundantly than in sumac, hence its collection is much more tedious. In color and consistency ivy lac resembles sumac lac very closely, but it is devoid of the peculiar sweetish odor of the latter. Qualitative tests, showed that it contains a brownish-red, poisonous resin soluble in alcohol, a non-poisonous gum-enzyme insoluble in alcohol, but soluble in water, and a third substance insoluble in either of these solvents.

Each of these substances possesses properties very similar to the corresponding substance in the latex of the sumac. The resin is apparently as venomous as its analogue in the sumac, but the gum-enzyme acts somewhat more slowly toward tincture of guaiac than does the sumac gum. No quantitative tests were made owing to lack of material, yet we believe that further work will show the proportions of the several ingredients of the two juices to be very similar.

THE FRUITS OF RHUS VERNIX.

The diameters of a considerable number of the fruits were measured. The values for the longer diameter lay between 4·91 mm. and 6·23 mm.; the shorter between 3·55 mm. and 5·04 mm. From these figures it will be seen that the size of the fruit varies considerably. One hundred specimens were selected at random from a large number and weighed. The stones were then removed and weighed. The following results were obtained from samples of 100 specimens each:

	I.	II.	Mean.
Fruit	2·4586	2·3836	2.4211
Stones	1·8596	1·7967	1·8286

The stones constitute 75·527 per cent. of the weight of the fruit.

A preliminary experiment showed that the ripened fruit contained an abundance of fat. The fat-content was determined as follows:

A quantity of the fruit, previously freed from stems, was ground to a No. 20 powder. About 25 grammes of the ground fruit were accurately weighed, placed in a Scheibler desiccator over colorless sulphuric acid, and dried to constant weight. The dried residue was then transferred to a percolator provided with glass stop-cock and percolated with petroleum benzin (b. p. below 65°) until exhausted. The solvent was then evaporated, the residue dried at 60° and weighed as fat. Fruit grown in 1905, which had been stored one year, gave a mean of 4·290 per cent. of moisture and 21·163 per cent. of fat, the latter being calculated on the undried sample as collected. Fruit grown in 1906, which had not been stored for any appreciable length of time, contained 4·951 per cent. of moisture and 19·225 per cent. of fat. No volatile oil was present in the fruits, as was shown by the fact that the desiccating acid remained colorless during the entire drying of the ground fruit. The crude fat is a hard, greenish-white solid, which has a faint, peculiar odor and a faint, somewhat tallow-like, rather unpleasant taste. Its specific gravity is, uncorrected, 0.9749 at 25° C./25° C. It melts at 38°= 39° C. It is readily saponifiable, sap. No. 236.3, iodine No. 13.105. The crude fat is almost insoluble in cold alcohol; rather difficultly soluble in hot alcohol, from which a large proportion separates on cooling in splendid, white, crystalline flocks. After crystallizing once from benzin and twice from alcohol, the purified fat melted at

43·5° C. to 45·5° C., uncorrected. Its iodine absorption number (Hübl) is 3·39. On saponification with alcoholic potassium hydroxide the purified fat yields an excellent soap and an abundance of glycerin, 1 gramme requiring 236·7 to 237·4 mg KOH.

Analysis of the purified fat gave the following results:

I.

0·2979 gramme gave 0·3187 gramme H_2O and 0·8173 gramme CO_2.

II.

0·2960 gramme gave 0·3136 gramme H_2O and 0·8119 gramme CO_2.

	I. Per Cent.	II. Per Cent.	Mean. Per Cent.
Hydrogen	11·966	11·851	11·908
Carbon	74·824	74·806	74·815

Eberhardt[36] has reported that Japan tallow consists chiefly of palmitin with small quantities of the glycerides of isobutyric and oleic acids, together with unsaponifiable matter. Geitel and van der Want[37] have further reported the presence of the glyceride of a dibasic fatty acid not previously described, which latter they call "Japanic acid."

Our analysis conforms more closely to myristin than to palmitin, as seen by the following:

	Found.	Calculated for Myristin.	Calculated for Palmitin.
H	11·908	11·990	12·239
C	74·815	74·724	75·861
O	13·277	13·286	11·900

Sumac tallow conforms closely in its physical and chemical properties to the published observations upon Japanese tallow. Further work may prove that the two are identical, or very similar in composition. Owing to lack of time, we have not continued the investigation of this substance.

The alcoholic mother liquors remaining after the first crystallization of the fat were concentrated and a second deposit of nearly colorless white fats was given. The process was repeated until, after four deposits of fat had been obtained and the mother liquors had been concentrated until no more alcohol remained, a small quantity of a dark, brownish-yellow fluid oil remained, from which no more solid fats could be separated. A preliminary examination of the

[36] Inaug. Diss., Strassburg, 1883.

[37] J. Pr. Chem., 61, 151–6.

stones from the fruits showed that they contained a small amount of a fluid fat, which probably accounts for the fluid fraction in the fat from the entire fruits as obtained above. The fat in the stones was determined as follows:

A quantity of the stones (free from wormy specimens) was freed from adhering fats by carefully scraping with a pen knife and subsequent washing in petroleum benzin of low boiling point. After drying in the air, the stones were ground to a No. 20 powder, the moisture determined by drying over colorless sulphuric acid, and the fat extracted from the dried substance by petroleum benzin, as was the case with the entire fruit. Calculated on the air-dried sample the stones contained 5·161 per cent. of water and 0·8489 per cent. of fat. This fat is a pale yellow, odorless, tasteless, non-poisonous, liquid oil. It is easily saponifiable and is apparently non-drying. The quantity obtained was too small to permit many determinations being made. Its iodine absorption number (Hübl) was 130, and its saponification number (one determination only) 267·7.

That the fluid fractions of the fat from the entire fruit are very largely derived from the stones rather than from the mesocarp, is shown by the following facts and experiments:

A quantity of the fruit was triturated roughly in a mortar in such a manner as not to break the stones. The mass was subjected to moderate pressure under warm water until most of the fat from the mesocarp was removed. The water was cooled, the fat collected, melted, strained and dried. Its iodine absorption number was 3·98 or nearly the same as that of the fat from the entire fruit (3 4), which had been purified by recrystallization from alcohol. The iodine number of the crude fat from the entire fruit was 13·10 and that of the fluid fat from the stones 130. Since the stones contain but 0·89 per cent. of fat (0·6 per cent. of the entire fruit), a simple calculation shows that the crude fat should contain 3·12 per cent. of the fat from the stones. With an iodine number of 130, this amount would materially increase the iodine number of a mixture, the other components of which are fats having low iodine equivalents.

No poisonous constituent could be detected in the ripened fruit. Neither starch, alkaloids nor glucosides were present, but the residues remaining after extraction of the fats with benzin were very rich in nitrogen.

Pfaff[38] states that he found 3·6 per cent. of crude "toxicodendrol" in the fruit of *Rhus toxicodendron*, but does not give the amount in *Rhus vernix*, though we are led to believe that he found it in the fruit of this species. He says: "It (toxicodendrol) was found in all parts of the plant—stems, branches, roots, leaves and fruits—its amount, however, varying, the fruit and leaves containing most. The oil was found in *Rhus toxicodendron* as well as *Rhus venenàta*" (*Rhus vernix*). For the extraction of his "toxicodendrol" we believe that Pfaff must have employed fruit which had been collected in a green state or contaminated with other parts of the plant, for we have repeatedly examined the fully ripened fruit of both these species and have been unable to find any traces of poison in either.

As before stated, we have found 19–21 per cent. of fat in the fully ripened fruit of *Rhus vernix*, and from the mature fruit of *Rhus radicans* (deprived of their pericarps) we have obtained 33·4 per cent. of a greenish-white, solid fat, which closely resembles that from sumac fruit, but is slightly softer and less brittle. Its specific gravity is 0·9577 at 25° C./25° C.; saponification value, 238·55 mg. KOH; and its iodine absorption number 30·119. When purified by one crystallization from hot alcohol it is a hard, brittle, white, solid fat, similar in appearance to that obtained by similar treatment from the crude fat of the sumac, although slightly softer and less brittle. The purified fat melts at 42° to 42 5° C. (uncorrected). Meyer[39] states that the wax from *Rhus toxicodendron* (*R. radicans*) melts under all conditions at 42° C., and is, therefore, probably a pure substance. We have found that the crude fat as extracted from the fruit is not a pure individual substance, since a single crystallization from alcohol not only yields a product that is much whiter, harder, and more brittle than the crude fat, but lowers its iodine number from 30·1 to 15·8. Probably its iodine number could be lowered still further by repeated crystallizations.*

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[38] Jour. Exp. Med., 2, 188.

[39] Arch. Pharm., 25, 120.

*Read before the Scientific Section of the American Pharmaceutical Association, September, 1907.

SOME ASSAYS OF DRUGS COLLECTED FROM CULTIVATED PLANTS.

By John R. Rippetoe, P.D.

Owing to the increasing scarcity, higher prices, and the poor quality of many of the wild medicinal plants, any data as to their cultivation for commercial purposes is usually looked upon with interest.

For the past few years the supply of belladonna has been steadily decreasing, and at the same time it has become poorer in quality. Formerly the chief supply was collected in England and Germany from wild plants, and judging from the macroscopical examination of samples of the root from German markets, they were collected irrespective of the season or age of the plant. The alkaloidal content of the root upon assaying seldom averages over ·4 per cent. mydriatic alkaloids, some averaging ·30 per cent., and in one sample as low as ·20 per cent. About 10 to 15 per cent. of the samples run as high as ·5 per cent., one sample being received that assayed ·61 per cent., possibly from cultivated plants properly collected. The leaves usually are of better quality, the average yield of total alkaloids of ten samples being ·35 per cent. Leaves procured in the English market assay very good, one sample received assaying ·76 per cent.

The cultivation of belladonna has been undertaken at various places in this country and, according to reports, with very good success. Last year (1906) I undertook the cultivation of a few plants as an experiment in the Shenandoah Valley of Virginia, and the results so far have been quite satisfactory.

The seed was planted in hot-house boxes about February 1st, and the plants were transplanted several times before finally setting them out in the open, which was in the middle of June. The young plants are very tender, and the loss in handling from the first box to the field is usually very great.

By September 1st the plants were 18 to 30 inches high, the season up to this time being very wet, raining almost every day. By October 1st several of the plants were 40 inches high, and a sample of leaves collected at this time assayed ·32 per cent. mydriatic alkaloids.

About two-thirds of the plants withstood the winter, and with the first signs of spring began to grow. Last year each root produced

only one stem, but this year each root had three stems about equal in size. By the middle of July the plants averaged 4 feet in height and by October 1st about 65 inches. A sample of leaves collected in July, when the plants were flowering, assayed 0·68 per cent. An average plant, collected October 1st, produced 7 ounces of dry leaves, assaying 0·48 per cent., and 5 ounces dry root, assaying 0·38 per cent.

Although the samples represent a very short period, it is very encouraging to note the high alkaloidal content of the leaves from the second year's growth, and also the quantity which in the moist condition of the commercial drug would possibly weigh 7½ to 8 ounces. The root is below the U.S.P. requirement, but is up to the average of the drug on the market.

The plants are in a sandy soil, in rows 3 feet apart, and almost completely shaded by peach trees.

EMULSION OF CASTOR OIL.

By M. I. Wilbert.

Numerous attempts have been made, from time to time, to present castor oil in a form that would be quite, if not entirely, unobjectionable.

Additions of alcohol, volatile oils and of carbon dioxide have all had their advocates, and the various forms of emulsions have repeatedly been discussed in and out of meetings.

Emulsions made with acacia, tragacanth, yolk of egg or casein are generally objectionable on account of the viscid character of the resulting preparation. Saponin has been objected to on account of its possible deleterious effect, so that practically the only substance that offers a fair solution of the emulsion problem is soap.

Soap has been recommended from time to time and has quite recently been discussed rather thoroughly in several of the European pharmaceutical journals. The following suggestions are, therefore, not to be considered as embodying anything new or original.

A simple formula for a satisfactory soap emulsion of castor oil might be given as follows:

Castor oil	50·0 c.c.
Powdered castile soap	1·5 grammes.
Spirit of peppermint	3·0 c.c.
Solution of saccharin, N. F.	1·0 c.c.
Distilled water, to make	100·0 c.c.

To the powdered soap, in a clean, dry mortar, add the castor oil and the spirit of peppermint, mix well and gradually add, with constant stirring, the solution of saccharin and enough water to make 100 c.c.

The resulting mixture is a white, limpid emulsion that separates partially on long standing, but will readily mix again on shaking.

For an extemporaneous preparation a solution of soap, such as that for which a formula was published on page 415 of this JOURNAL for October, 1907, will be found to be preferable.

The procedure for making an emulsion with liquid soap would be about as follows ;

To 50 c.c. of castor oil and 3 c.c. of spirit of peppermint, in a suitable bottle, add 5 c.c. of liquid soap, mix thoroughly by shaking, and add the solution of saccharin and enough water to make 100 c.c. The solution of saccharin may, of course, be replaced by an equivalent quantity of syrup.

NASCENT FERROUS CARBONATE.

BY M. I. WILBERT.

A formula for a solution of ferrous carbonate was given in this JOURNAL some time ago (September, 1907). Since that time a proprietary preparation has been brought to my attention that appears to offer some advantages and is certainly more palatable than the solution referred to above.

In this preparation, that is claimed to be the result of extensive studies and costly experiments, advantage is taken of the solvent and inhibiting properties of glycerin.

A preparation having all of the properties of the proprietary article may be made by dissolving the requisite amount of granulated ferrous sulphate in water, diluting with glycerin and adding to this solution a solution of the requisite amount of potassium carbonate in the remaining portion of glycerin.

A detailed formula would be as follows:

Ferrous sulphate	3·2 c.c.
Distilled water	1·5 c.c.
Potassium carbonate	1·6 grammes.
Glycerin, to make	100·0 c.c.

Each 5 c.c. of the resulting solution would represent the equivalent of one pill of ferrous carbonate.

The resulting solution is clear, transparent and dark green in color. It decomposes readily when exposed to air and moisture, and should be directed to be liberally diluted when administered.

FIFTY-FIFTH ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

By Florence Yaple.

SCIENTIFIC SECTION.

(*Continued from page 498.*)

The Physical Constants of the Chemical Compounds of the United States Pharmacopœia.

By Atherton Seidell.

The author compared the constants given in the United States Pharmacopœia with those given in literature, and found that there is most variation in solubilities. He thought that in giving solubility a statement should be made of the parts by weight. He also said that when constants are determined they should be on chemically pure substances rather than on United States Pharmacopœia pure substances.

Professor Coblentz remarked that the solubilities given in the United States Pharmacopœia are those of the official chemicals. The author then remarked that he thought if the constants were absolute, they would be helpful in determining the purity of the substances.

Data Relating to Fluidextracts.

By Joseph Feil.

The author prepared a table showing eighty different fluidextracts, with 11 columns of figures, as follows: Columns 1, 2, 3, 4 and 5—maximum alcoholic strengths taken from the labels of five manufacturing houses. Column 6—percentage of alcohol in the official menstruum. Column 7—average percentages of moisture in the ground drug, determined at 105° C. Column 8—average percentages of "extractive," some compiled and some determined. Column 9—percentages of alcohol remaining in the finished preparations, calculated by assuming that 100 grammes "extractive" measures 60 c.c. Column 10—the average of Columns 1 to 5 for comparison with Column 9. Column 11—the difference between Columns 9 and 10.

THE IDENTIFICATION OF TINCTURES BY CHEMICAL MEANS.
By Frederic E. Niece.

The author called attention to the desirability of having chemical means of identifying tinctures, and submitted qualitative tests for the identification of a number of official tinctures.

SCOPOLA VERSUS BELLADONNA.
By A. R. L. Dohme.

The author gave several reasons why he considers that scopola should be used indiscriminately for belladonna.

THE FOOD VALUE OF PREDIGESTED FOODS.
By A. R. L. Dohme and H. Engelhardt.

The authors criticized the method and results of the chemists of the Council on Pharmacy and Chemistry as published in the *Journal of the American Medical Association* for May 11, 1907.

The following are the newly elected officers of the Section: chairman, Virgil Coblentz; secretary, Charles E. Vanderkleed; associate, Joseph Feil.

COMMERCIAL SECTION.

H. D. Knisely, chairman; Charles H. Avery, secretary; associate chairmen: J. R. Francis, Charlotte E. Stimpson and William C. Powell.

The sessions of this Section were held on Thursday, simultaneously with those of the Scientific Section.

The chairman reviewed the conditions of the past year, and said, among other things, that the Indianapolis injunction decree would in his opinion make no material change in business.

After the presentation of the secretary's report, the following subjects were taken up:

The Science of Commerce as Applied to Pharmacy. Henry P. Hynson.

How to Make a Drug Store Attractive and Advertise Side Lines. William Mittelbach.

A Preachment on the Inventory. Harry B. Mason.

Mr. Mason contended "that the day has come when the American pharmacist must do business in accordance with twentieth century methods." This, he said, "is simply the lesson of evolutionary science." He then pointed out that "the inventory forms the very basis of the structure," and gave directions as to the manner of procedure.

Fire Insurance from a Pharmacist's Standpoint. Frank H. Freericks.

Symposium on Some National Formulary Preparations.

Elixir Terpini Hydratis cum Heroina. Jacob Diner.

Liquor Antisepticus and Antiseptic Powder. Joseph L. Lemberger.

Mistura Chlorali and Potass. Bromidi Comp. and Syrupus Hypophosphitum Comp. Henry P. Hynson.

One Preparation and How I Made It a Success. William C. Alpers.

To Prevent Store Loafing. J. B. Moore.

The Rural Free Mail Service of 1912. James L. Cowles, Secretary Progress Postal League.

More to Think About. William F. Kaemmerer.

The author presented forcible arguments to show that the question of shorter hours and better pay for drug clerks is one of the most vital questions in pharmacy, and pointed out its relation to the labor question. With equal propriety he might have placed it in the class of humanitarian questions.

The Cocoa Bean Situation in the Summer of 1907 from the Commercial Standpoint. By A. M. Hance.

The new officers chosen were as follows: Chairman, Jacob Diner; secretary, G. O. Young; associate chairmen: A. V. Pease, C. W. Benfield and Frank H. Carter.

HISTORICAL SECTION.

Ewen McIntyre, chairman; E. G. Eberle, secretary; Edward Kremers, historian.

This Section held an interesting session on Friday morning, when the following programme was presented:

Report of the chairman. Report of the secretary. Report of the historian. A Short Sketch of Albert E. Ebert, by C. S. N. Hallberg. Professor Hallberg stated that by action of Council copies of the Ebert Memorial Volume would be furnished each member of the association, and that copies would also be furnished pharmaceutical institutions. Henry Canning, by S. A. D. Sheppard; William W. Goodwin, by S. A. D. Sheppard; Missouri and the A. Ph. A. in 1867, by H. M. Whelpley; Some Prominent American Pharmacists (illustrated with lantern slides), by H. M. Whelpley; John Milhau,

by Rene Leon de Milhau (his grandson); George D. Coggeshall, by Ewen McIntyre; E. R. Squibb; Charles Ellis, by Joseph P. Remington; Henry J. Meninger, by Ewen McIntyre; Paul Baluff, by Gustav Ramsperger; The History of the New Jersey Pharmaceutical Association, Continued, by E. A. Sayre; A Bibliography of the London Pharmacopœia, by Edward Kremers; A Contribution from William J. Schieffelin; Documents Pertaining to the Anniversary Number of the Druggists' Circular, by F. B. Hays; Photographs of Pharmacists, by Ewen McIntyre; Pharmaceutical Notes from Nuttall's Journey into "Arkansa" Territory, by Edward Kremers; Bulletin Lloyd Library, by J. U. Lloyd; Some Pharmaceutical Data before and during the Civil War, by Edward V. Howell; Notes on Historical Aspects of the Drug Trade in New York, by Caswell A. Mayo; Brief Historical Sketch of the University of Texas and its Department of Pharmacy, by E. G. Eberle; Brief Historical Sketch of Baylor University and its Founder, Rufus C. Burleson, and its College of Pharmacy, by E. G. Eberle; Various Publications of Texas Schools, etc., by E. G. Eberle; Lebanon, Past and Present, with other Rhymes, by J. H. Redsecker.

Officers were chosen as follows: Chairman, E. V. Howell; secretary, E. G. Eberle; historian, Edward Kremers.

BIOGRAPHICAL SKETCH OF THE LATE JAMES THORNTON SHINN.[1]

By John F. Hancock.

James T. Shinn was born January 9, 1834, in the city of Philadelphia.

His parents belonged to the Society of Friends, and they instilled in his young mind principles calculated to make a strong character.

He was educated in the Friends' Select School, of Philadelphia, and the boarding school at Westtown, Chester County, Pa.

The good influences of home and school gave him a training, morally and intellectually, that fitted him for the responsible positions which he filled in after life and made him the useful man he was.

He possessed rare qualities of mind and heart, which, with his commanding presence, inspired confidence and respect. He was a genial companion, cultivated and well informed on general topics.

[1] For portrait of Mr. Shinn, see frontispiece.

In his dealings he was honorable and just; a man of excellent judgment, accurate and prompt in business.

He was advanced in the autumn of life, but with his faculties well preserved, and still actively engaged with works of benevolence—when,

"Like a shadow thrown
Softly and sweetly from a passing cloud,
Death fell upon him."

On the morning of October 4, 1907, on arising to perform his regular duties of the day, he was taken suddenly ill, and in a brief space of time his noble spirit fled from its human habitation.

Imagination suggests that such a death is most terrible to the family and friends who survive.

It has been said of Daniel Webster that, when dying, in his last breath he uttered, "I still live."

We believe that the real individuality of James T. Shinn still lives, and we are left to treasure his memory and emulate his example.

Those who paid their last respects to his mortal remains must have been impressed with the beautiful tributes to his memory by speakers who had known him for years.

His sudden death was a great shock to his many friends, but to those who will feel their loss most keenly—his wife and daughter—we express our heartfelt sympathy.

They have much to console them, however, in the purity of his character and useful life.

"To thine own self be true;
And it must follow, as the night the day,
Thou canst not then be false to any man."

He was a representative pharmacist, who leaves a clean record.

His memory should be held up in the College of Pharmacy as an example for the youth who are being educated for the practice of pharmacy. The wisdom of his example should be a beacon to the young graduate.

He taught pharmacists a valuable lesson, viz., that they could best serve their business interests by cultivating the mind to a benevolence broader than the confines of their chosen occupation, and to economize time that it may be employed in other pursuits, will improve their ability to practice pharmacy.

We have been informed that Mr. Shinn was cordial and friendly to his competitors.

We know that he was loyal and useful to his Alma Mater and had the confidence and respect of his colleagues in the college.

The same applied in the other organizations with which he was actively identified.

His labors of love, outside of pharmacy, when he was active in that business, did not cause him to neglect the duties of his store. He enjoyed the confidence of his patrons and the medical profession and was financially successful.

We had business dealings with him for quite a number of years without the slightest misunderstanding in a single case.

In his conduct of business he was above the tricks of trade.

During his five years of apprenticeship with the then well-known retail and wholesale drug firm of Charles Ellis & Co., he matriculated in the Philadelphia College of Pharmacy, from which he was graduated in 1854. His brother, Samuel E., was graduated from the same college in 1850, but died soon after entering business, at the northeast corner of Broad and Spruce Streets. After his death, James T. became his successor (in 1855), and in 1863 removed to the southwest corner of Broad and Spruce Streets, where the pharmacy still exists under the firm name of Shinn & Kirk. Mr. Shinn retired from the practice of pharmacy several years ago.

He was trained under the old regime, but when pharmacy began to drift toward more active commercialism, he became dissatisfied, and being financially able to retire, he left the occupation in which he had manifested the greatest interest for many years. He always entertained the highest ideals of the intellectual and moral status of pharmacy, on which subject we frequently conversed.

But Friend Shinn could not be idle, therefore he sought other employment.

His practical eye soon found objects of interest in which he might be useful and still have sufficient time to enjoy the comforts of his model home. In his beneficent work he was encouraged by his good wife and daughter, who were engaged in other works of charity.

We remember, on our last visit to his hospitable home, the interesting account he gave of his vacant lots enterprise, in which the poor were assisted in their effort to help themselves, by the cultivation of vegetables which they sold to the people of Philadelphia. In this work he and Mrs. Shinn were deeply interested and pleased because of the good results. In relating his experiences it was a modest recital of facts, devoid of vanity.

At the funeral, one of the speakers individualized the various institutions in which he was interested and actively employed, and demonstrated his good judgment and great capacity for such work.

He was not a seeker after office, but would not refuse his services in commendable enterprises.

He was actively identified with the Philadelphia College of Pharmacy for many years, as one of the Board of Trustees, and had been its treasurer since 1894. He was also interested in the AMERICAN JOURNAL OF PHARMACY, and with his pen had contributed to its pages. He was also a Commissioner of Pharmacy for twelve years, from the time of the passage of the Pharmacy Law.

He joined the American Pharmaceutical Association in 1860 and at that meeting was elected its secretary. He served on committees and was a forceful speaker at its meetings. In 1880 he was elected president. At the time of his death he was president of the Board of Managers of the Catharine Street House of Industry, president of the Association Center of the University Extension Teaching, and president of the Philadelphia Vacant Lots Association, secretary of the Pennsylvania Hospital; also, a manager of the Philadelphia Fuel-Savings Society and the Indian Rights Association.

We became acquainted with Friend Shinn in 1863 at the meeting of the American Pharmaceutical Association, and in after years we met at the annual meeting of the association, but it was not until the meeting of the association in Philadelphia, in 1876, that his worth was properly appreciated. After that time acquaintance ripened to warm friendship.

We never knew a man more honorable, just and true, and never felt the loss of a dearer friend; in which sentiment we are sure others will share.

CORRESPONDENCE.

AMERICAN PHARMACEUTICAL ASSOCIATION.

DEAR SIR:—At the recent annual meeting of the American Pharmaceutical Association the undersigned was directed to send you a copy of the following resolutions:

WHEREAS, The American Medical Association, the American Pharmaceutical Association and the National Association of Retail Druggists, together with many State and local organizations and

journals in both professions have been for some years endeavoring to bring about a return to the practice of medicine based on the Pharmacopœia; and,

WHEREAS, The medical colleges are represented on the Committee of Revision of the U. S. Pharmacopœia; and,

WHEREAS, It is manifest to the thoughtful men both in medicine and pharmacy that a very large number of medical men might be better informed regarding the Pharmacopœia as a book of reference and standards. Be it, therefore,

Resolved, That it is the sense of the American Pharmaceutical Association in convention assembled, that a great advance in the ethical practice of medicine and pharmacy will be made when the medical colleges make the Pharmacopœia a prescribed text-book or book of reference and require a familiarity with it in their examinations.

Resolved, That we request the governing authorities of all medical colleges in the United States to put into force such a ruling in their respective institutions as will insure in future classes a well-grounded knowledge of materia medica and Pharmacognosy, as set forth in the Pharmacopœia.

Resolved, That the General Secretary be directed to transmit a copy of these resolutions to each medical college in the United States and to the medical and pharmaceutical press.

Yours very truly,

CHAS. CASPARI, JR.,

BALTIMORE, October, 1907. *General Secretary*,

INDIA'S SPICES AND CONDIMENTS.

ALIMENTARY VALUE AND USE OF ORIENTAL SEEDS AND LEAVES.

In reply to a request for information by New England educational interests on the spices of India, Consul-General W. H. Michael writes as follows from Calcutta:

The terms spices and condiments are applied to a class of substances which possess aromatic and pungent properties, and are mixed with food for the purpose of exciting the appetite. Many articles of this class not only assist digestion but by tempting the palate increase the amount of food consumed and thus stimulate a flagging appetite. To the native of India spices and condiments

are indispensable, and in their production India has always been noted, if not preeminent, her ports having been resorted to by the nations of the West from prehistoric times in search of these commodities. India possesses a very large export trade in spices, which amounted last year in pounds to 11,008,000, and in value to about $46,666,665. This does not include cutch and turmeric, which although used in India as spices are exported mainly for industrial purposes. Cutch is used for tanning and dyeing, but is also used as a drug, especially in America. In India it is used as an ingredient in the mixture of betel nut, which the natives are so fond of chewing. Turmeric is a handsome herbaceous plant that is cultivated all over India, its yellowish tubers producing a yellow powder used by natives to some extent as a condiment, but which is most valuable as a chemical to detect the presence of alkalies. Cutch is produced largely in Bengal, Bombay, Madras Province, and in Burma, and from which places the average annual exports amount to 221,986 pounds, valued at $1,111,335. Of this the United States takes on an average about 70,000 pounds.

CARDAMOM AND THE BETEL NUT.

Both the greater and lesser cardamom, which are natives of Nepal, grow all over India where cultivated, and are much used in the preparation of sweetmeats by the natives on account of their cheapness. They are also used as ingredients of the pan or betel leaf preparation. Lesser cardamom grows wild in the mountains of southern India. It is considered as the most valuable of all the Indian condiments. The natives use it for flavoring purposes, and also for pan.

The betel nut is also called areca, and, while a native of China, it grows throughout tropical India. It is indispensable in the preparation of pan, and is probably the most popular nut with the native that grows in India. Everywhere on streets of India's cities one will see women squatted down mixing betel nut or pan, and offering it for sale to the passers-by. The mixture consists of betel nut, cinnamon, cardamom, and catechu in certain proportions wrapped up in a leaf of the betel tree. The "wad" is put into the mouth by the natives much as the old-time tobacco chewer put the "cud" into his mouth, and they chew it much in the same way. The effect is stimulating to the nerves, and stains the lips and tongue a deep

blood red. The quantity of betel nuts imported into India on an average from East Africa, Mauritius, Ceylon, Straits Settlements, and other countries, average annually about 39,520,000 pounds, valued at $1,235,655, while the export amounts to only 91,700 pounds, valued at $12,350. This shows what a tremendous consumption exists in India of betel nut; for it must be remembered that India produces much more than she imports of this article.

The leaves of the piper betel mixed with catechu, areca nut, and lime, and flavored with spices makes the pan so generally used. The trade in the leaf is entirely local.

The seeds of the various forms of mustard, rape, and cole are used in India as condiments and grow in great abundance. Onions and garlic and celery are produced to a large extent.

CHILLIES, CARAWAY, ROXBURGHIANUM, CLOVES, ETC.

The chillie, or capsicum, of several varieties are natives of America, but are grown all over India, and while not used as generally as in Mexico are consumed in large quantities by the natives of India. The caraway plant grows wild in Kashmir, now really a part of India, and is cultivated as a cold season crop on the plains. The true Bishop's weed is cultivated extensively in Bengal, Punjab, and south Deccan. The Roxburghianum plant, which resembles parsley, is eaten much in the same way as parsley, and the seed is used in flavoring curry. Cloves are cultivated mainly in south India, which supplies the market or bazaars of northern India, together with some importations from Ceylon.

There are probably three species of cinnamon produced in India and Ceylon. The cocoanut grows abundantly in India, principally in the southern part, along the coast. Coriander is a much prized condiment in India, and is almost indispensible in making a first-class curry. It is cultivated throughout India.

SAFFRON, CUMIN, GINGER, TURMERIC, CRUCIFERÆ, MINTS, AND NUTMEGS.

Saffron is grown in India to a limited extent, and is used in coloring and flavoring food. Cumin is used as spice with which to flavor curry, and is one of the oldest spices known to the natives of the country. It is most successfully cultivated in the provinces of Rajputana and the Punjab, in northern central India, and in the Dec-

can, southern India. Mango ginger grows wild in Bengal, India, and in the Himalaya Mountains as high up as 6,000 feet. It is used as a condiment and also as a vegetable. The turmeric is a native of south Asia, and is grown all over India for its rhizome, or root stock, which, when dried and reduced to a powder, is used as a spice in curries.

Cruciferæ are cultivated all over north and central India, and on the western Himalaya Mountains as high up as 10,000 feet. The seeds are crushed and the oil extracted therefrom, and the powder of the seed is used as a condiment. The oil is the most valuable part of the cruciferæ. Mint, called sometimes the marsh mint, grows abundantly in the western Himalayas, and is eaten by the natives as a condiment. Peppermint grows well when it receives proper care. Spearmint grows all over the plains of India, and is much used in curries and other forms of food. Nutmeg and mace are cultivated in south India. In parts of India there is a nut 1½ inches long and a half inch thick, which is much like the true nutmeg, and is offered for sale as such, but it is not so good.

PEPPER, MISCELLANEOUS ARTICLES, AND EXPORTATIONS.

Long pepper is a perennial shrub of eastern India, Nepal, and east Bengal and Ceylon. The fruit of this shrub is dried and used as a spice. The black pepper, which is a climber, also grows well in India. The berries of the black pepper are eaten as a condiment in curry, and in powder form, is the black table pepper of the West.

The following spices and condiments are also grown in India, either as indigenous or introduced plants: Fennel, hops, black cumin, sweet basil (the seeds and leaves of sweet basil are eaten by the natives of India as a cooling condiment); dill, used in curry; anise, introduced from Persia by the Mohammedans and is used lavishly in India "sweets;" cubebs, a native of Java and Sumatra; fenugreek, which grows wild in Kashmir and the Punjab, and cultivated generally on the plains of India; scitaminea, native of India, and used as a spice; ginger, cultivated in India for its root, but not known in its wild state; spikenard, which grows all over India, and is used as a medicine for coughs, and the leaves for food, usually known as "greens."

Exports of spices from India for 1906–7 dropped from $3,000,000 in value in 1905–6 to $2,000,000 in 1906–7, a decline of 33.69 per

cent, which is stated to be due principally to the contraction in the exports of pepper, which fell off 9,499,000 pounds, valued at $1,000,000, The export of ginger declined in value $95,000. This article, however, brought a higher price during the last year, selling on an average at nearly 5 cents per pound. The export of chillies increased during the year 22.37 per cent. in quantity and 12.34 per cent. in value.—*Daily Consular and Trade Reports*, October 12, 1907.

A PLEA FOR UNIFORMITY IN THE NOMENCLATURE OF ALKALOIDS AND THEIR DERIVATIVES.[1]

In a letter to the *Pharmaceutical Journal* (August 10, 1907, p. 233), Dr. Gordon Sharp, of Leeds, writes as follows:

Some years ago it was the custom in Great Britain to make all alkaloids and their derivatives end in "ine," while glucosides, resins, and principles not alkaloids, were made to end in "in." Now all is hopelessly mixed up, and no order is observed—just as is the case in German literature. If the Germans send us over a new derivative of an old alkaloid, editors, chemists, physiologists, and pharmacologists (not to speak of the downtrodden clinician) seem to think it should be written as our Teuton friends think. To take a few examples: In the same sentence I read eucaine and cocain (both alkaloids) and heroin and dionine, two morphine derivatives which came to us from Stockman and Dott, but neglected till an enterprising German firm took them up. To continue, the more or less pure ergot alkaloids are written, cornutin-Keller, cornutine-Kobert, chrysotoxin, secalintoxin, sphaceletoxin, ergotoxine, hydroergotinin. I could go on multiplying the list, but it is needless. It would be much simpler if investigators paid attention to the old rule, so that when one came across a new name ending in "ine" we should know that it was alkaloidal in nature.

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[1] The practice does not seem to be any better in the United States, an instance having recently come to notice where the author in the same paper used the erminations "in" and "ine" for the same alkaloid.—EDITOR.

OIL OF JUNIPER.

Hansen and Babcock (*Jour. Amer. Chem. Soc.*, 1906, p. 1198) obtained from the leaves and branches of *Juniperus communis* 0·15 to 0·18 per cent. of a bright yellow oil, which had a characteristic juniper odor, and gave d_{20}° 0 8531. Schimmel & Co. (Report, April, 1907) examined a Russian oil which behaved as follows: d_{15}° 0·8675; a_D + 8° 46′; ester no. 11·4; soluble in 6 or more volumes 90 per cent. alcohol with slight turbidity.

THE AMERICAN PHARMACEUTICAL ASSOCIATION.

PHILADELPHIA BRANCH.

The first stated meeting of the Philadelphia Branch of the American Pharmaceutical Association, for the season 1907–1908, was held on the evening of Tuesday, October 1, 1907, at the College of Physicians.

The programme for the evening was a discussion of the U.S.P. and N.F. Propaganda.

For the Committee on Exhibitions, the chairman, Dr. H. C. Wood, Jr., reported that the exhibition of official preparations that was made under the auspices of the local branch, at the annual meeting of the American Medical Association, at Atlantic City, in June, was generally acknowledged to have been an unqualified success.

It was generally conceded that the exhibition by the Philadelphia Branch was by far the most attractive, certainly the most frequented, exhibit in the exhibition hall at Atlantic City. That it was popular and effective is shown by the fact that it was heartily praised by the better class of physicians, and as heartily and thoroughly condemned by the makers of nostrums and their friends.

Dr. Wood recited some personal experiences that he had had in connection with the exhibition, and in conclusion said that he felt satisfied that the work that had been inaugurated by the Philadelphia Branch would be taken up and elaborated on by other associations.

The secretary-treasurer reported that, in addition to the exhibition at Atlantic City, a number of the preparations had also been shown at several of the branch meetings of the Philadelphia County Medical Society, and that the whole collection had been loaned to the

Pennsylvania Pharmaceutical Association for exhibition at the meeting of the Medical Society of the State of Pennsylvania, at Reading, Pa., September 23d to 26th.

Mr. Ambrose Hunsberger, in a paper entitled, "The Need for Personal Work," expressed the opinion that personal equation was an important factor in the development of the professional side of pharmacy. In pharmacy, as in all professional pursuits, study must be continuous and constant. The man who has given up the study of the science of his profession has begun to decline.

The battle for supremacy is on in earnest, and the pharmacist, to maintain his position, must be able to refute the charge of incompetence that is now being heard on all sides. To succeed as he should, he must produce tangible evidence that he is capable of giving better service, to the physician and his patients, than is the manufacturer direct.

Mr. Hunsberger insisted that personal work was absolutely essential in this propaganda, and outlined his ideas of the proper course to pursue in approaching physicians. In conclusion, he recounted a number of instances of how not to do it, and was particularly earnest in his warning against slovenliness and incompetence.

Mr. Franklin M. Apple read a paper on "Possibilities of Association Work," in the course of which he described the work that had been done under his leadership as chairman of the Ethical Preparations Committee of the N.A.R.D. He emphasized the fact that pharmacists must, individually, be prepared to assist the association work by being able and willing to demonstrate their ability to furnish the necessary preparations.

Among the retarding influences, he enumerated carelessness in making the official preparations, unpreparedness on the part of pharmacists, the publication of tactless literature and the demoralizing influence of the muck-rakers.

Mr. John K. Thum read the concluding paper, entitled, "Some of the Obstacles to be Overcome."

He characterized as the most serious of these obstacles the apathy and shortsightedness that appears to dominate the better equipped and generally better educated pharmacist; and, secondly, the well-developed streak of laziness that is such a common characteristic of the average retail druggist of to-day.

It is generally known that physicians are willing and even anxious

to secure correct information on matters relating to pharmacy; but, unless pharmacists are in position to furnish accurate and satisfactory information, they will discredit, not alone themselves, but also the other members of their craft. To meet the legitimate requirements of physicians for information and assistance, pharmacists must be aroused and made to take a more active part in the professional side of their calling.

Dr. Wood, in answer to an inquiry, said that while it must be admitted that, theoretically, the manufacturer has certain advantages in the making of preparations that are, or are said to be, physiologically tested, practically this advantage was not so important. The claims that are made by manufacturers are not infrequently based on false premises or incomplete data, and in some cases at least have been proven to be incorrect. He believed that any apparent advantage that the manufacturer possessed at the present time could readily be overcome by intelligent and concerted action on the part of pharmacists.

Professor Remington advised pharmacists to adhere strictly to the official formulæ. There is danger of being penalized, in addition to discrediting the whole movement for popularizing official preparations.

Dr. F. E. Stewart pointed out that the pharmacist cannot shirk responsibility in the dispensing of prescriptions; he must satisfy himself of the genuineness and the efficiency of the substances he dispenses, regardless of whether he makes them himself or not.

Mr. Wilbert pointed out the need for post-graduate work for pharmacists, and incidentally referred to several incidents that had come to his attention recently that appeared to him to indicate that the average pharmacist is not so well informed on the properties of the substances that he is dispensing as he really should be.

Dr. John V. Shoemaker expressed himself as being pleased at having attended the meeting of the Philadelphia Branch, and while he was sorry to say that it was the first meeting that he had attended, he assured the members that it would not be the last. He was particularly gratified to note the intense interest and earnestness that had been manifested by the pharmacists present in the discussion of the problems involved in the advancement of the professional side of their calling, and assured his hearers that their efforts would certainly be rewarded.

He felt that physicians were largely to blame for present-day conditions, and he for one had received a new incentive to work in the efforts of having the present abuses corrected.

The subject was further discussed by Drs. Wood, Stewart and Lowe and by Messrs. Harbold, Stanislaus, Apple, Remington, Koch and Wilbert.

The consensus of the opinions expressed by the several members appears to be that, physicians being in a receptive frame of mind, it is clearly the duty of the pharmacist to fit himself for the important task of furnishing correct and up-to-date information on all matters relating to pharmacy, and to be prepared to furnish any or all of the official preparations, strictly according to standards, at comparatively short notice, on physicians' prescriptions.

M. I. WILBERT, *Secretary.*

EXHIBITION OF OFFICIAL PREPARATIONS

AT THE ANNUAL MEETING OF THE MEDICAL SOCIETY OF THE STATE OF PENNSYLVANIA.

The annual meeting of the Medical Society of the State of Pennsylvania, at Reading, Pa., September 23–26, 1907, is generally admitted to have been one of the most notable in its long era of usefulness.

While matters of economic interest were given considerable prominence, and were freely discussed, the scientific papers that were read and discussed were not alone much more numerous, but were generally listened to by larger and more appreciative audiences, clearly indicating that while the average physician is not unmindful of his own interests, he is primarily interested in matters of scientific, or professional, importance that he can utilize for the benefit of his patients and the community at large.

Altogether, upwards of 112 communications were presented, and by far the greater number of these were rather freely discussed by the members in attendance at the several meetings.

Among the more interesting innovations, and one that attracted the attention of a considerable number of the members in attendance at the annual meeting, was an exhibition of official preparations, under the auspices of the Pennsylvania Pharmaceutical Association.

As noted in a previous number of this JOURNAL, this exhibition

had been authorized by the State Pharmaceutical Association at the recent annual meeting in Bedford Springs. A committee of eight members, with Mr. William L. Cliffe as chairman, had been appointed to arrange for the exhibition, and also to serve as delegates from the Pharmaceutical Association to attend the meetings of the State Medical Society.

In addition to the much appreciated and really creditable exhibition, the committee had also secured several hundred copies of the "Manual of the U.S.P. and N.F.," recently published by the American Medical Association. These booklets, with a correspondingly large number of pamphlets entitled, "The Propaganda for Reform in Proprietary Medicines," were freely distributed and were much appreciated by the visiting physicians.

Of the delegates appointed by the President of the Pennsylvania Pharmaceutical Association, Messrs. Cliffe, Hunsberger, Lemberger and Stein were in constant attendance to explain the advantages of using official or open formulary preparations in preference to secret proprietaries of variable or uncertain composition.

At the concluding General Session of the State Medical Society, Mr. William L. Cliffe, the chairman of the delegation from the Pennsylvania Pharmaceutical Association, was invited to address the society on the object of the Pharmaceutical Association in making this exhibition.

After presenting the greetings and felicitations of the State Pharmaceutical Association, Mr. Cliffe briefly outlined the object of the present propaganda for popularizing U.S.P. and N.F. preparations, and concluded by expressing the wish that members of the State Medical Association, who had seen the exhibition and had been interested in the preparations there presented, would continue their interest, and he further assured them that by lending a hand to aid in the advance of the science of pharmacy they would materially assist true progress in the science of medicine.

Many of the physicians in attendance at the meeting of the State Medical Association were loud in their praises of the enterprise shown by the pharmacists in making this exhibition, and the members of the delegation of the Pharmaceutical Association, who were present, were shown every courtesy possible, both by the officers of the State Society as well as the members of the local Committee of Arrangements.

PHILADELPHIA COLLEGE OF PHARMACY.

SEMI-ANNUAL MEETING.

The semi-annual meeting of the Philadelphia College of Pharmacy was held September 30, 1907. The meeting was called to order at 4 P.M. by the president, Howard B. French. The minutes of the meeting of the college, held June 24, 1907, were read and approved. The minutes of the Board of Trustees were read by the acting secretary of the Board, F. P. Stroup, and approved.

The report of the Committee on Nominations, proposing nominees for the Board of Trustees, was received and filed. William McIntyre requested that his name be dropped from the list of nominees, as it would be impossible for him to serve, and on motion, duly seconded, his request was complied with.

Professor Kraemer, in the absence of the chairman, Professor Remington, made a verbal report for the delegates to the meeting of the American Pharmaceutical Association held in New York City. He stated that the college was well represented, all of the Faculty being in attendance and many of the Board of Trustees and other members. Pharmaceutical education was largely discussed, as also the relations of the American Medical Association and the American Pharmaceutical Association, thus making clear to the medical fraternity the work of the pharmacists. There is also good reason to believe that some of the problems now confronting the two organizations will be solved in a satisfactory manner. Doctor Cohen, in his address, urged that recrimination be not indulged in, but that the members get together in a spirit of harmony, when, he predicted, many of the evils now complained of will disappear. The remarks of Doctor McCormack were along the same lines and had a good effect. The subject of degrees came in for a large share of the discussion, and it was thought that in the future the degree of Doctor in Pharmacy would be generally adopted. The papers and discussions of the several sections were to say the least, up to the usual standard of merit, and the meeting as a whole marked in a definite way another milestone in the progress of American pharmacy.

The President appointed the following as the Committee on Membership: C. B. Lowe, M. I. Wilbert, E. M. Boring, James T. Shinn (since deceased), and C. A. Weidemann.

The following-named gentlemen proposed for honorary membership at the meeting, held June 24th, were then balloted for and unanimously elected: Dr. Harvey W. Wiley, Chief of the Bureau of Chemistry, United States Department of Agriculture, Washington, D. C.; Richard T. Baker, Curator and Economic Botanist of the Technological Museum, New South Wales; Henry G. Smith, Assistant Curator and Chemist of the Technological Museum, New South Wales; Professor Nagayoshi Nagai, Professor of Pharmacy of the College of Medicine of the Imperial University of Tokyo, and President of the Pharmaceutical Society of Japan; Dr. H. Thoms, Professor of Pharmacy and Director of the Pharmaceutical Institute of the University of Berlin; Dr. Nathaniel Lord Britton, Director of the New York Botanic Gardens, New York City.

The tellers appointed to conduct the election of three trustees for the ensuing three years reported the re-election of Richard M. Shoemaker, Edwin M. Boring and Charles Leedom.

Professor Kraemer presented a photographic reproduction of an oil painting of the late Professor John M. Maisch, made when he was twenty-five years of age; also a photograph of President French, for which the thanks of the college were tendered him.

Professor Sadtler reported that the number of matriculants for the coming session materially exceeded that of classes for several years past, and that quite a number had matriculated for the Food and Drug course.

Professor Lowe informed the meeting that Dr. Singer, the Assistant Superintendent of Public Education, told him that he had never had a better class of certificates presented to him.

ABSTRACT FROM MINUTES OF THE BOARD OF TRUSTEES.

June 4, 1907.—The Joint Committee of Finance and Property reported that they had given careful consideration to the plans for the new Pure Food and Drug Laboratory, and submitted same to the Board for their action. They further recommended that a committee be appointed, authorized on behalf of the college to solicit subscriptions for such sums as can be obtained for the erection of the building.

A communication was received from the dean regretting his inability to be present, as he had arranged to deliver an address at the meeting of the American Medical Association.

A communication was received from Joseph L. Lemberger regretting that an important engagement prevented his attendance, but he wished to encourage the project for the new Pure Food and Drug Laboratory.

The revision of the plans for the new building was referred to the Committee on Property, with power to act.

The Committee on Library reported a number of accessions during the month, some by gift and others by purchase.

The Committee on Accounts and Audit reported having examined the accounts of the treasurer, registrar and the AMERICAN JOURNAL OF PHARMACY, and found them correct.

The Committee on Instruction presented a lengthy report covering the work of the past college year, and submitting a number of recommendations for the action of the Board. The recommendations were considered seriatim and adopted.

The Committee on Commencement reported that May 21, 1908, would be the date for holding the next commencement.

An amendment of Article VIII, Section I, of the By-Laws, proposed at the meeting in April, was adopted.

The registrar was authorized to express the thanks of the Board to the press of the city for the publicity given the recent commencement exercises.

Charles J. Heinle was elected to active membership.

C. A. WEIDEMANN, M.D.,
Recording Secretary.

OCTOBER PHARMACEUTICAL MEETING.

The first of the series of pharmaceutical meetings of the Philadelphia College of Pharmacy for 1907–08 was held on Tuesday afternoon, October 15th, with Dr. R. V. Mattison, vice-president of the college, in the chair.

The meeting was devoted to a symposium on the cultivation of medicinal plants. Prof. Henry Kraemer was the first speaker on the programme, and in his opening remarks said that this being the harvest season, it was deemed an opportune time to call attention to the practical results obtained by several graduates of the college in the growing of medicinal plants. He then gave the results of his own experiments in the growing of over 100 native medicinal

plants, a large proportion of which are shaded woodland plants and require the protection of shrubs and trees. The experiments showed that this condition is of more importance than even that of soil, the plants being not only protected from the sun, but also from beating rains and winds. Of the plants requiring protection of this kind, hydrastis was especially mentioned.

Professor Kraemer said that not only are many drug-yielding plants growing scarce, but in a number of instances the drugs have fallen into disrepute by reason of their scarcity and the consequent spurious character of the drugs supplied. As examples of such drugs, aspidium and spigelia were mentioned. He then spoke of the diversified habits of medicinal plants and pointed out the necessity for experience in their cultivation. In this connection he exhibited petri dishes containing prothallia of *Aspidium marginale*, which had been developed from the spores under nearly sterile conditions, and said that he was making a study of the plant with a view to its cultivation. He called attention to the fact that the rhizome of a comparatively young plant will yield as much of the active drug as an older plant, as the rhizome gradually dies at the posterior end, losing its green color.

Professor Kraemer stated that there are some medicinal plants which, on account of their destructive influence on other plants, it is not desirable to cultivate except under special control conditions, as corn smut and ergot, and said that he had successfully grown corn smut the year round in the laboratory. He thought that possibly ergot might be grown by means of nutrient media prepared from cereals, such as wheat and rye.

Prof. C. B. Lowe recalled an instance in which some imported aspidium, purchased by the late Professor Maisch, was without green color, due probably to the fact that the rhizomes had been sliced previous to drying, and the quality thus affected through exposure. He then spoke of the beneficial influence of the forest reserves in preserving the native plants within their boundaries.

Dr. John A. Borneman, of Philadelphia, presented some data on "The Naturalization of Foreign Medicinal Plants." He said that for a number of years past he had been associated with Mr. Lewis Hellerman, of Lawndale, Pa., in the growing of medicinal plants, particularly foreign plants, and that they had been remarkably successful. Among other foreign plants, they have cultivated the following, all of which, it was stated, can be grown on a large scale

and with little cost, except aconite: *Atropa Belladonna*, *Digitalis purpurea*, *Hyoscyamus niger*, *Pulsatilla* (*Anemone*) *pratensis*, *Conium maculatum*, *Aconitum Napellus* and *Bryonia alba*. Some of the difficulties met in the cultivation of these plants were mentioned by Dr. Borneman. Efforts to grow aconite plants, both from imported seeds and seedlings, met with failure. Belladonna, while usually doing well, is sometimes attacked by a worm which bores through the root, causing the plant to wither and die. In the growing of belladonna it was found an advantage to take up the roots in the fall, bury them, and set them out in the spring, rather than to propagate the plants from seeds. The roots produced by bryonia plants were small as compared to the commercial drug. In one instance the first year's growth of hyoscyamus was good, but the crop was destroyed by insects the second year. Digitalis does not well survive the winter. Tests showed that digitalis leaves, contrary to statements sometimes made, are more potent in the fall, after flowering, as are also small leaves grown in the shade.

Dr. Borneman said that they had also taken up the cultivation of a number of medicinal plants indigenous to the Southern States. Of those which can be grown successfully in Pennsylvania, he mentioned the following: *Passiflora incarnata*, *Echinacea angustifolia*, and *Nicotiana Tabacum*.

In concluding his remarks, the speaker stated that they now have fifty or eighty species of plants under cultivation, and that next year they would probably add fifty more.

Mr. M. I. Wilbert said that it was interesting to note that a century ago the Friends' herb gardens, one of which was on Walnut Street, flourished in Philadelphia, and that one of the founders of the college was interested in the sale of the drugs derived therefrom, and then mentioned the fact that Benjamin Franklin had sent from England a specimen of *Rheum rhaponticum* to John Bartram, who cultivated the plant for a number of years.

Dr. Mattison conjectured that the influence of the Pure Food and Drug Law would tend to promote the cultivation of medicinal plants.

Prof. Joseph P. Remington said that the claim had been made that some cultivated plants are not as rich in active principles as those in the wild state. He then spoke of the fugitive qualities of digitalis leaves, and said that no satisfactory method having been devised for their assay, a tincture of fresh leaves could be introduced into

the Pharmacopœia if physiological tests showed it to be the more active.

In reply, Dr. Borneman said that his experience showed that belladonna and digitalis leaves, from cultivated plants, are above the standard. Then, referring to the subject of the relative value of fresh and dry drugs, he said that pulsatilla is much more active when fresh, and that bryonia, while inert when dry, is useful in a number of diseases when fresh.

John R. Rippetoe, P.D., of New York City, sent a communication entitled "Some Assays of Drugs Collected from Cultivated Plants," which was read on his behalf by Edwin M. Boring. (See page 523.)

Edwin L. Newcomb, P.D., assistant in the department of botany and pharmacognosy, gave the results of experiments in the farming of medicinal plants, which had been conducted under his supervision the past summer by a number of persons who were interested in agricultural pursuits and experimental farming, in the vicinity of Vineland, N. J. The plants were nearly all grown from seeds, and under conditions which would obtain on a commercial scale. The following is a list of the plants which were grown: *Capsicum* species, *Papaver somniferum*, *Coriandrum sativum*, *Atropa Belladonna*, *Salvia officinalis*, *Lobelia inflata*, *Digitalis purpurea*, *Nepeta Cataria* and *Panax quinquefolium*.

A large number of specimens of the drugs, and the plants from which they were derived, were exhibited. In addition, Professor Kraemer called attention to an original package of new season's Allen's English digitalis leaves, a sample from a supply imported by Messrs. Lehn & Fink, of New York City. It is stated that the leaves are collected and selected with special care, and dried at a low temperature, so as not to impair the active glucosides. The drug was packed in a glass bottle, and the package accompanied by a potency certificate. Dr. Mattison presented a handsome specimen of asbestos from the Canadian mines, which, he said, are the largest in the world.

During the course of his remarks, Professor Kraemer announced that he had seeds of belladonna and *Veratrum viride*, which he would be glad to furnish in small samples as long as his supply lasted.

M. I. Wilbert, Ph.M., demonstrated the preparation of, and gave formulas for, "Emulsion of Castor Oil" and "Nascent Ferrous Carbonate." (See pages 524 and 525).

FLORENCE YAPLE,
Secretary pro tem.